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MISSISSIPPI'S FOREST INDUSTRY

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A REPORT OF THE SOUTHERN FOREST SURVEY
William A. Duerr, In Charge

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THE SOUTHERN FOREST SURVEY

The Southern Forest Survey, an activity of the Southern Forest Experiment Station, covers the seven States of the Station's territory--Alabama, Arkansas, Louisiana, Mississippi, Oklahoma, Tennessee, and Texas. This Survey is a part of the nation-wide Forest Survey authorized by the McSweeney-McNary Forest Research Act of 1928. Its fivefold purpose is (1) to take inventory of the supply of standing timber and other forest products; (2) to ascertain the rate at which this supply is being increased through growth; (3) to determine the rate at which this supply is being diminished through industrial and local use, and by fire, insects, disease, and other agencies; (4) to estimate the present requirements and the probable future trend in the requirements for timber and other forest products; and (5) to correlate these findings with existing and anticipated economic conditions, in order that policies may be formulated for the effective use of lands suitable for forest production.

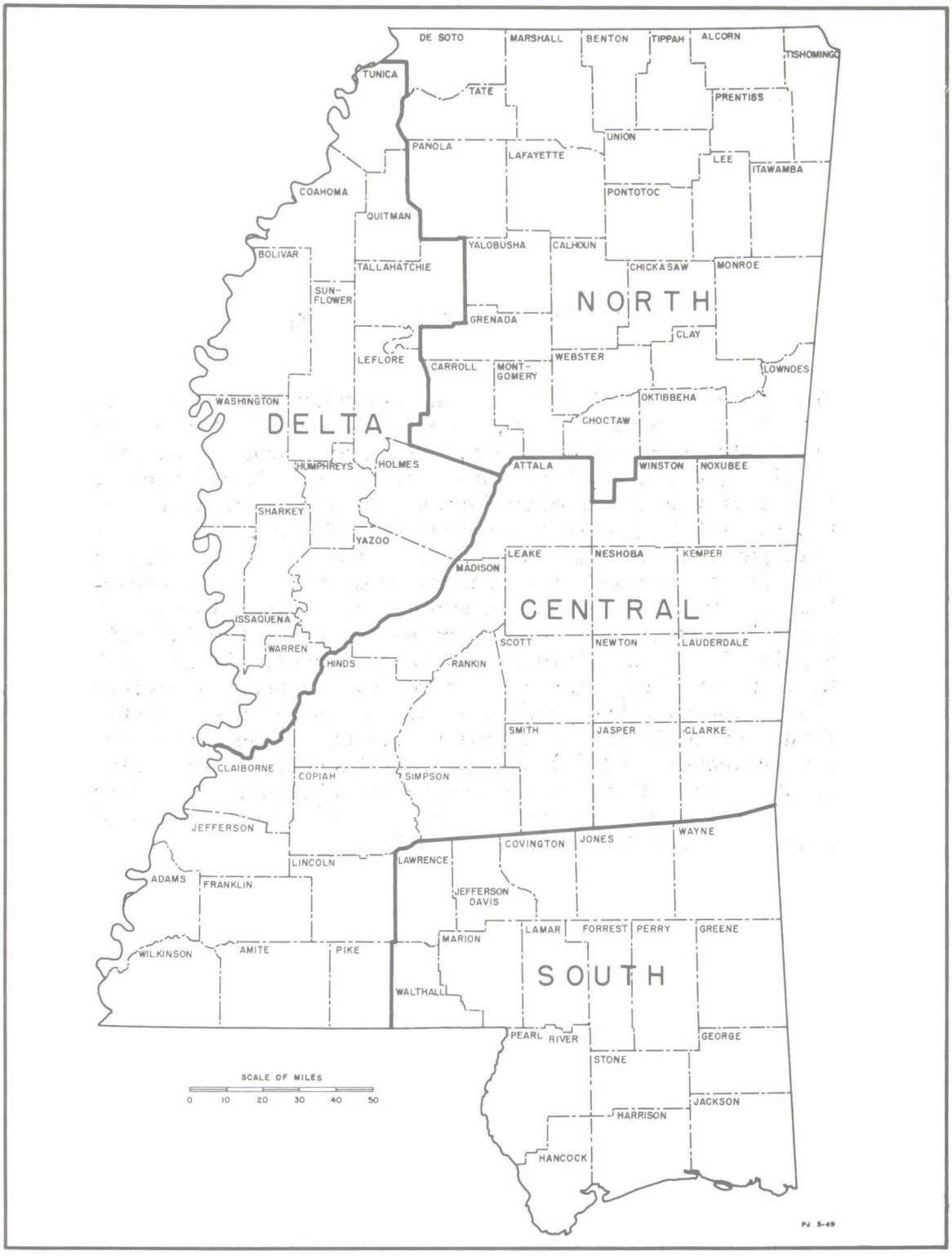

Figure 1.--Survey regions and counties in Mississippi.

CONTENTS

	Page
Summary	1
Income and employment	3
Production	5
Lumber	5
Pulpwood	7
Naval stores	8
Veneer	8
Cooperage	8
Other products	9
Location of plants processing raw products	9
Location of timber-cutting operations	13
Movement of timber products to plants	14
Length of haul	14
Wood exports and imports	15
How lumber production varies by size of sawmill	16
Effect of cutting on stands	16
Degree of utilization in logging	16
Species used for different products	17
Size, quality, and proportion of volume cut	18
Large sawmills versus small sawmills	20
Changes in the forest resource	21
The outlook for timber production	23
Lumber	23
Pulpwood	24
Veneer	24
Cooperage	25
Naval stores	25
Other products	25

Figures

1. Survey regions and counties in Mississippi	ii
2. Value of raw timber products and value added by manufacture, 1946	3
3. Softwood lumber production in Mississippi, 1904-47	6
4. Hardwood lumber production, 1904-47	7
5. Pulpwood production, 1936-48	7
6. Location of sawmills, 1946	10

7. Location of plants (other than sawmills) that process raw forest products, 1946 11
8. Cutting of logs and bolts by county, 1946 12
9. Total output of all round or split timber products by species group and Survey region, 1946 13
10. Cut of major raw timber products by Survey region, 1946 14
11. Lumber production by size of sawmill in the four regions of Mississippi, 1946 16
12. Net cubic volume in logs and bolts utilized as a percentage of the total growing-stock volume of the trees from which they were cut, 1946 17
13. Drain on major species for different timber products, 1946 19
14. Percentage change in sawlog and total growing-stock volume between 1932-35 and 1946-48 22

Tables

1. Income payments to people of Mississippi, 1946 4
2. Employment in forest industry, 1946. 4
3. Distribution of volume of output by round or split timber product and species group, 1946 5
4. Total log and bolt production by Survey region, 1946 28
5. Lumber production and number of sawmills by size of sawmill, 1946. 29
6. Sawlog production by county, 1946 30
7. Pulpwood production by county, 1946. 32
8. Production of fuel wood, fence posts, and miscellaneous domestic products from live timber by county, 1946 34
9. Pole and piling production by county, 1946 36
10. Veneer log production by county, 1946 38
11. Cooperage bolt production by county, 1946 40
12. Hewn tie production by county, 1946. 42
13. Production of miscellaneous log products by county, 1946. 44

MISSISSIPPI'S FOREST INDUSTRY

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Timber is one of the chief sources of income to the people of Mississippi. It is therefore important to understand the forest industry that makes this income--the location of the industry, its timber production, its effect on the forest resource, and its prospects in the light of changing timber supplies. This report attempts to answer these questions. It is based mainly on the second Forest Survey of Mississippi, made in 1946-48,[1] and secondarily on the Survey of 1932-35.

Summary

Timber products are one of the chief sources of income to Mississippians. The 1946 value of round or split timber products in Mississippi was $122 million, and further manufacture within the State added $130 million in value. The employment afforded by the forest-products industries was 68,000 man-years, but the actual number of workers was much larger than this.

About one-fifth of the timber cut is in the form of fuel wood, fence posts, and other items which are not transported to plants for further manufacture or are not moved to concentration points for shipment or treatment. All the rest of the timber cut goes to plants or concentration points.

Concentration points for hewn ties and poles and piling are well scattered throughout the regions in which these products are harvested. Sawmills--nearly 2,000 of them--are found throughout Mississippi, particularly in the central and north regions. Other plants using logs and bolts are also distributed fairly well in total. There are 38 nonlumber plants in the north, 54 in the central region, 39 in the south, and 23 in the Delta.

Most of the timber processed or consumed within the State is obtained locally. Fuel wood and fence posts are generally used on the same properties on which they are cut. From the same counties in which they are located, sawmills get 74 percent of their logs, cooperage plants get 61 percent of their timber, and veneer plants get 44 percent of their logs. But a substantial volume of timber is hauled longer distances to plants, particularly pulpwood. Pulp mills draw 45 percent of their wood from beyond a radius of 50 miles.

1/ Location of forest-products plants and cutting operations, movement of timber products to plants, and production except for products of domestic use were determined from a 100-percent canvass of forest-industrial firms. Output of fuel wood, fence posts, and other items of domestic use was estimated from an area sample of producers.

Because a large volume of logs and bolts does move across several counties and because wood-using plants vary greatly in their timber consumption, the pattern of timber cutting differs markedly from the pattern of plant location. The central region is easily the heaviest timber-cutting region of the State. It has 36 percent of the forest area, but turns out 59 percent of the unprocessed softwood logs and bolts and 43 percent of the hardwood products. It supplies more than half the sawlogs, pulpwood, and hewn ties, half the veneer logs, and nearly 40 percent of the cooperage bolts. South Mississippi furnishes 20 percent of the total raw products; north Mississippi, 19 percent; the Delta, 10 percent.

Cutting to a low minimum tree diameter is the usual type of cutting in Mississippi, but it varies by products. The average sawlog cutting in pine stands takes nearly all trees over 12 inches in diameter and almost three-fourths of the 10- and 12-inch trees. Pulpwood cutting goes down to smaller sizes--it takes three-fourths of the 6- and 8-inch trees. Other pine products are not cut so heavily as pulpwood and sawlogs.

Hardwood cutting does not usually remove as large a portion of the stand volume as pine cutting, but its effect on the stand is probably as severe when tree grade and species selection are considered. The typical hardwood operator cutting sawlog-size trees for any product takes all the trees with grade 1 logs and more than two-thirds of the trees with grade 2 logs. The merchantable trees left standing are chiefly lower grade. Moreover, cutting is concentrated among the more valuable species.

In the 14 years between the two Forest Surveys, Mississippi's forest resource has continued to decline in important respects. Softwood total growing stock (trees 5 inches or larger in diameter breast high) has dropped 20 percent in volume, with the heaviest losses occurring in the larger tree sizes. Hardwood growing stock has held its own in total; but the drain has been in the more valuable species and the larger trees, while compensating growth has been in the less desirable species and sizes. Hardwood sawlog volume has been cut back 20 percent in the 14 years. In upland areas, pine forests (in which pines make up at least a fourth of the dominant trees) have been replaced by generally less valuable hardwood forests on 2.2 million acres.

Mississippi's forest-products industries are based on a declining resource, but at least since World War I there has been no falling off in total raw timber output. The volume of total timber cut has been sustained primarily by a tremendous increase in pulpwood production (for which small timber is usually preferred) and by industry adjustments in the utilization of other products. One of the most significant of these adjustments has been a strong shift in lumber manufacture from large mills sawing millions of board feet annually to small portable mills which can operate in scattered stands of small timber. These small mills now manufacture 60 percent of all lumber. Another important adjustment

has been a gradual shift in both lumber and pulpwood production from softwood species to the more plentiful hardwoods.

In view of the changes in the forest resource between the two Forest Surveys, the prospect of sustaining timber output for most products at recent levels is doubtful. In fact, it seems certain that under prevailing conditions of forest management there will be sharp declines in the output of important products like softwood lumber, softwood pulpwood, and veneer. Only through immediate and considerable improvements in forest management and by further adjustments in utilization can the forest industry hope to sustain timber production at the levels of recent years.

Income and Employment

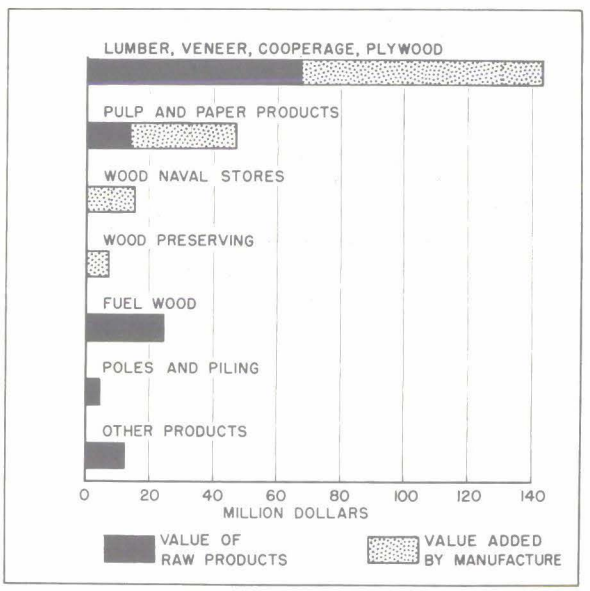

Figure 2.--Value of raw timber products and value added by manufacture, 1946.

The 1946 value of raw timber products (logs, bolts, and other round or split products, and also gum and wood naval stores) in Mississippi was $122 million. Further manufacture within the State added $130 million in value (figure 2). One group of products--lumber, veneer, cooperage, and plywood--makes up three-fifths of the total value of $252 million.

In terms of those income payments to the people of Mississippi which are directly attributable to timber products, the value of $252 million is reduced to some $202 million.2/ This $202 million is 17 percent of the 1946 total income payments from all sources ($1,182 million) to the people of the State (table 1). This compares with 23 percent from agriculture, 24 percent from trades and services, 25 percent from all forms of government, and 11 percent from industries other than forest-products industries and miscellaneous sources.

2/ An estimated $22 million worth of fuel wood and other timber products is used on the farm but is never sold. In addition, an estimated $28 million is credited to nontimber sources of income or to the net flow of profit to people outside the State.

Table 1.--Income payments to people of Mississippi, 1946

Source[1/]	Million dollars	Percent
Government	294	25
Trades and services	288	24
Agriculture	270	23
Timber products	202	17
Other manufactures and miscellaneous sources	128	11
Total	1,182	100

1/ Total income payments and income payments from government, trades and services, and agriculture are from "Survey of Current Business," U. S. Bureau of Foreign and Domestic Commerce, August 1947. Income from timber products is derived from calculated value of raw timber products and value added by manufacture. Income from other manufactures and miscellaneous sources is a residual between total income payments and all other items in table.

How many workers find employment in forest industry cannot be estimated with accuracy, since much of the employment is part-time. Woods workers commonly are farm workers who supplement their farm income with seasonal woods labor. But in terms of full employment (fifty 40-hour weeks a year), Mississippi's forest industry provides about 68,000 man-years of employment--35,000 in cutting products in the woods and hauling them to mills, and 33,000 in manufacture (table 2).

Table 2.--Employment in forest industry, 1946

Forest industry	Woods	Mill	Total
	----- Man-years ----		
Lumber and lumber products	12,100	20,900	33,000
Pulp and paper products	6,200	4,700	10,900
Veneer, plywood, and cooperage	2,400	4,600	7,000
Naval stores	2,100	1,700	3,800
Wood preserving	...	1,000	1,000
Poles and piling	1,900	...	1,900
Hewn ties	1,700	...	1,700
Fuel wood and other farm use	8,800	...	8,800
Total	35,200	32,900	68,100

Production

The 1946 cubic volume of all timber products in the round or split piece was 473.5 million cubic feet--239.3 million in hardwood, 234.2 million in softwood (table 4, page 28).

In the matter of softwood volume, the spotlight is held primarily by sawlogs and secondarily by pulpwood (table 3). Together, these items account for 85 percent of the total. Poles and piling and fuel wood, although important, are a poor third and fourth in the total softwood output. Among hardwood products, fuel wood is just behind sawlogs. Pulpwood, in third place, has come up rapidly, but still comprises only 8 percent of the hardwood output.

Table 3.--Distribution of volume of output by round or split timber product and species group, 1946

Product	Softwood	Hardwood	All species
	Percent		
Sawlogs	54	37	46
Fuel wood	5	34	19
Pulpwood	31	8	19
Poles and piling	6	0	3
Cooperage bolts	(1/)	6	3
Veneer logs	1	5	3
All other	3	10	7
Total	100	100	100

1/ Negligible.

Lumber

Lumber has long been--and still is--the dominant product of Mississippi's forest industry, but its heyday is past.

Early production was mainly for local use. The opportunity for export to the northern and central States did not come until the lumber industry had cut deep into the pineries of the Lake States late in the last century and turned southward for new sources of pine. In Mississippi, the Illinois Central, the Southern, and the Gulf and Ship Island Railroads opened up the virgin pine forests to exploitation. By 1902, when the last of these railroads was built, lumbering got under way in earnest. Softwood lumber manufacture rose rapidly to 2.2 billion board feet, mill tally, in 1909 and reached its all-time peak of 2.6 billion feet in 1925.

Throughout the period 1904-29, softwood lumber manufacture in Mississippi rose at the average rate of nearly 20 million board feet a year. But in 1929 the era of big production came abruptly to its end. Softwood lumber output plunged from 2.2 billion board feet in 1929 to a low of 0.4 billion in 1932 (figure 3).

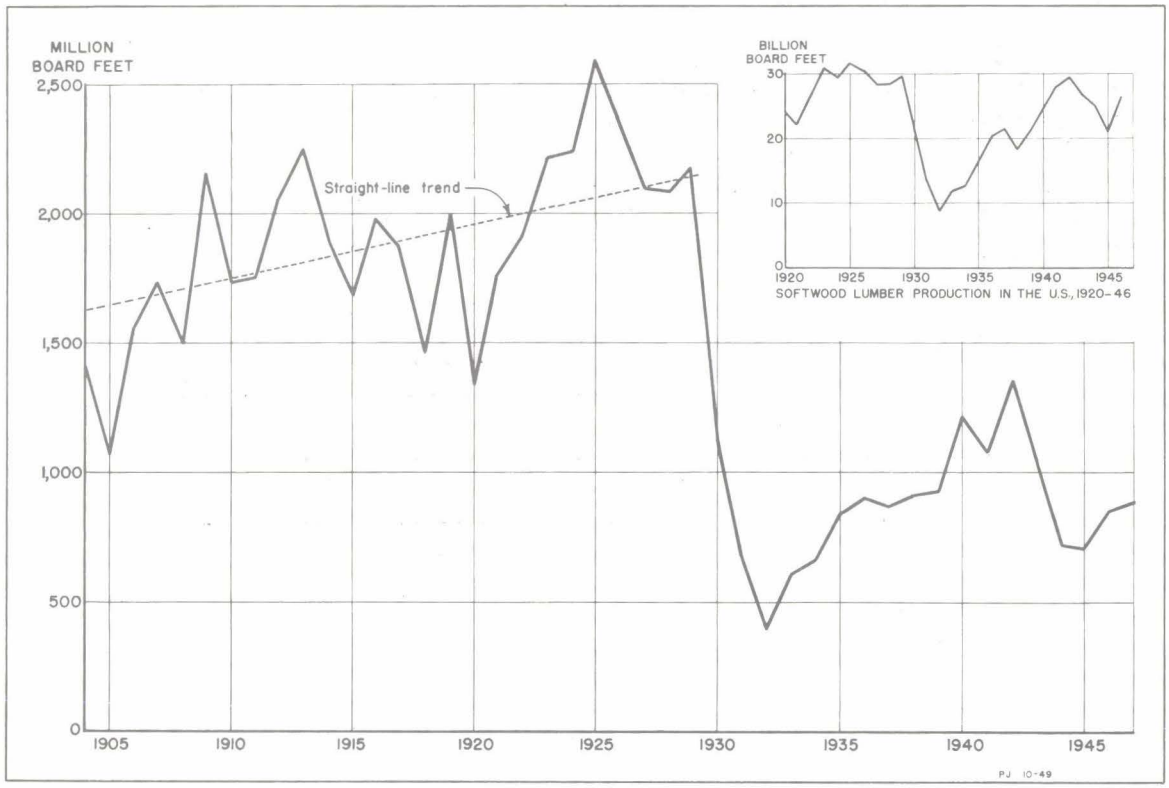

Figure 3.--Softwood lumber production in Mississippi, 1904-47. (Source: U. S. Bureau of the Census.)

Softwood lumber manufacture was sharply curtailed over the whole country by the Great Depression, but after 1932 it climbed back fairly rapidly. In 1939-46, annual softwood lumber production nationally averaged 90 percent of what it was in the 1920's. In Mississippi, however, no such recovery took place; annual softwood lumber output averaged less than half that of the 1920's.

Hardwood lumber manufacture in Mississippi, until recent years, lagged far behind softwood. Its prewar peak of 567 million board feet in 1924 was only one-fourth of softwood manufacture in the same year. Nevertheless, the trend of hardwood lumber production has been up over the years, and wartime output of hardwood lumber was greater than in any previous years (figure 4). By 1945, hardwood manufacture was nearly nine-tenths of softwood.

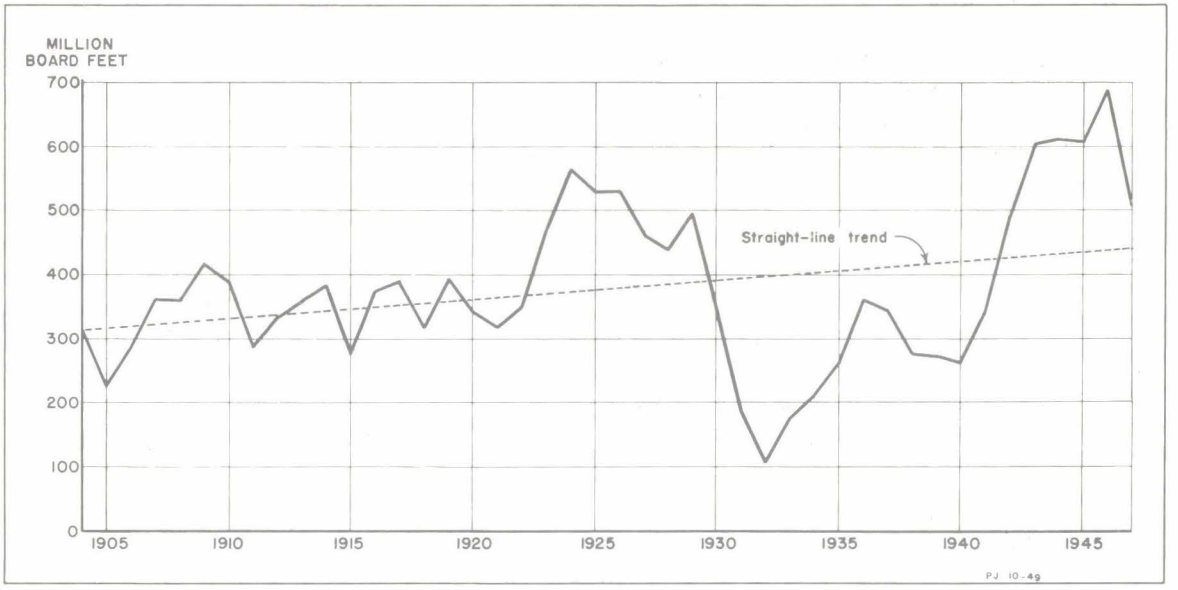

Figure 4.--Hardwood lumber production, 1904-47. (Source: U. S. Bureau of the Census.)

Much of the wartime boost in hardwood lumber manufacture was due to the rapid expansion of special uses for which hardwood was satisfactory at a time when pine lumber was in short supply. There was one-third more standing hardwood saw timber than softwood, and quality was of less concern than at any time before or since; hardwood could, therefore, be drawn on to help meet the intense wartime demand.

Pulpwood

The spectacular growth of pulpwood cutting in Mississippi is the most notable of all timber production trends. From less than 300,000 standard cords (128 cubic feet per cord) in 1936, output jumped to 1,434,000 cords in 1948--the average increase was nearly 100,000 cords a year (figure 5). A remarkable feature of this upward trend was its steady persistence through major changes in the economy from peace to war to peace again.

One reason for the rate of increase in pulpwood output was that out-of-state mills drew heavily on Mississippi timber.

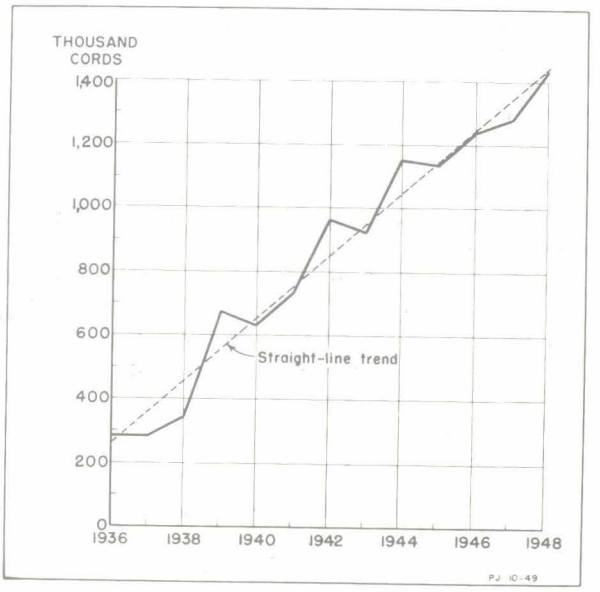

Figure 5.--Pulpwood production, 1936-48.

Of the 1,238,200 cords of pulpwood cut in the State in 1946, some 703,000 cords went to mills outside the State.

This tremendous growth in pulpwood cutting was enough to compensate, in terms of solid volume, for the large decline in softwood lumber manufacture since World War I. If it had not been for pulpwood, Mississippi's total raw wood production would have declined nearly one-third.

Naval stores

Heavy yield of gum naval stores coincided with the big lumbering operations in Mississippi's longleaf pine belt. By 1921, the yield of gum naval stores in the State reached its all-time peak of 53,000 barrels (50 gallons per barrel) of turpentine and 185,000 barrels (500 pounds per barrel) of rosin. Thereafter, yield fell off rapidly as the virgin longleaf was depleted. The end of the era of big softwood lumber manufacture in 1929 was also the end of big output in gum naval stores.

The general increase in economic activity from the depression of the 1930's was not shared by gum naval stores in Mississippi. Added to the problem of falling demand was a problem of rising costs in operating the smaller trees left for chipping and mounting labor costs in what is essentially a handicraft industry. By 1938, gum yield had recovered to only 32 percent of the 1921 peak. Subsequently, it dropped year by year to a mere 4 percent in 1946.

The yield of naval stores in Mississippi from stumps of old-growth longleaf and slash pines has come up rapidly in recent years. In 1936, some 300,000 short tons of stumps were pulled from the ground; in 1947, 623,000 tons. This expansion in wood naval stores has been enough to counterbalance the decline of the gum naval stores industry.

Veneer

Veneers produced in Mississippi are chiefly for the package and plywood industries, although some logs go into face veneers. Despite sharp cyclical changes in the volume of veneer logs cut, the trend, from the beginning of the record in 1906, has been upward at the average rate of more than 2 million board feet a year. In 1946, the cut of veneer logs hit an all-time peak of 110 million board feet (International 1/4-inch rule).

Cooperage

The volume of tight cooperage cut rose to about 40 million board feet of logs in 1910, then declined at a fairly rapid rate. Production has followed the erratic course of demand, reaching 40 million board feet (International 1/4-inch rule) again in 1946, but

in general it has remained well below the peak years which preceded World War I. A prominent factor in the decline was the early cutting out of the best white oak.

Slack cooperage has more varied uses than tight cooperage and thus a more stable market. It also takes a wider variety of tree species, sizes, and grades. Consequently, it has had a long period of steady growth in production. The prewar peak of 30 million board feet of logs in 1929 was at least doubled in 1946.

Other products

Fuel wood ranks with pulpwood in volume of output. It accounts for 19 percent of round and split timber products. Although data on trends in production are exceedingly scarce, the long-term trend is clearly downward. This is obvious from the consistent inroads made by other fuels like coal, oil, and gas into fuel wood's traditional use. Little fuel wood is used off the farm, and even on the farm, its use has been falling off. Nearly one-fourth of Mississippi's farmers use some other fuel either exclusively or predominantly. This is only partly because the timber resource is diminishing. To many farmers, coal, oil, and gas appear to be superior fuels, and they eliminate the chore of chopping wood.

All other products--hewn ties, poles and piling, fence posts, and miscellaneous items--account for only one-tenth of the volume of logs and bolts. These products are not so important to the economy of Mississippi as are most of those previously described. Although trends are uncertain, it is clear from regional data that logging for hewn ties and poles and piling has fluctuated cyclically in response to the demand of specialized markets.

Location of Plants Processing Raw Products

Sawmills are the most numerous wood-processing plants in Mississippi (figure 6). The 1,981 active sawmills are most heavily concentrated in the north and central regions of the State; they are least concentrated in the Delta. A majority of sawmills--1,248 --are classed as small mills (sawing less than 500,000 board feet of lumber apiece annually). Medium-size mills (sawing from 500,000 to 2,999,000 feet) number 631. There are only 102 large mills which saw 3,000,000 or more feet a year.

In 1946 there were 202 idle sawmills in the State. Although most of these mills are small, they comprise an important marginal element in the industry. Their owners are usually farmers who saw lumber only when they need some or when the opportunity for profit looks good.

Figure 7 shows the locations of plants other than sawmills that process raw forest products. Five pulp mills are shown, although the fifth mill, at Natchez, was built after 1946. A sixth

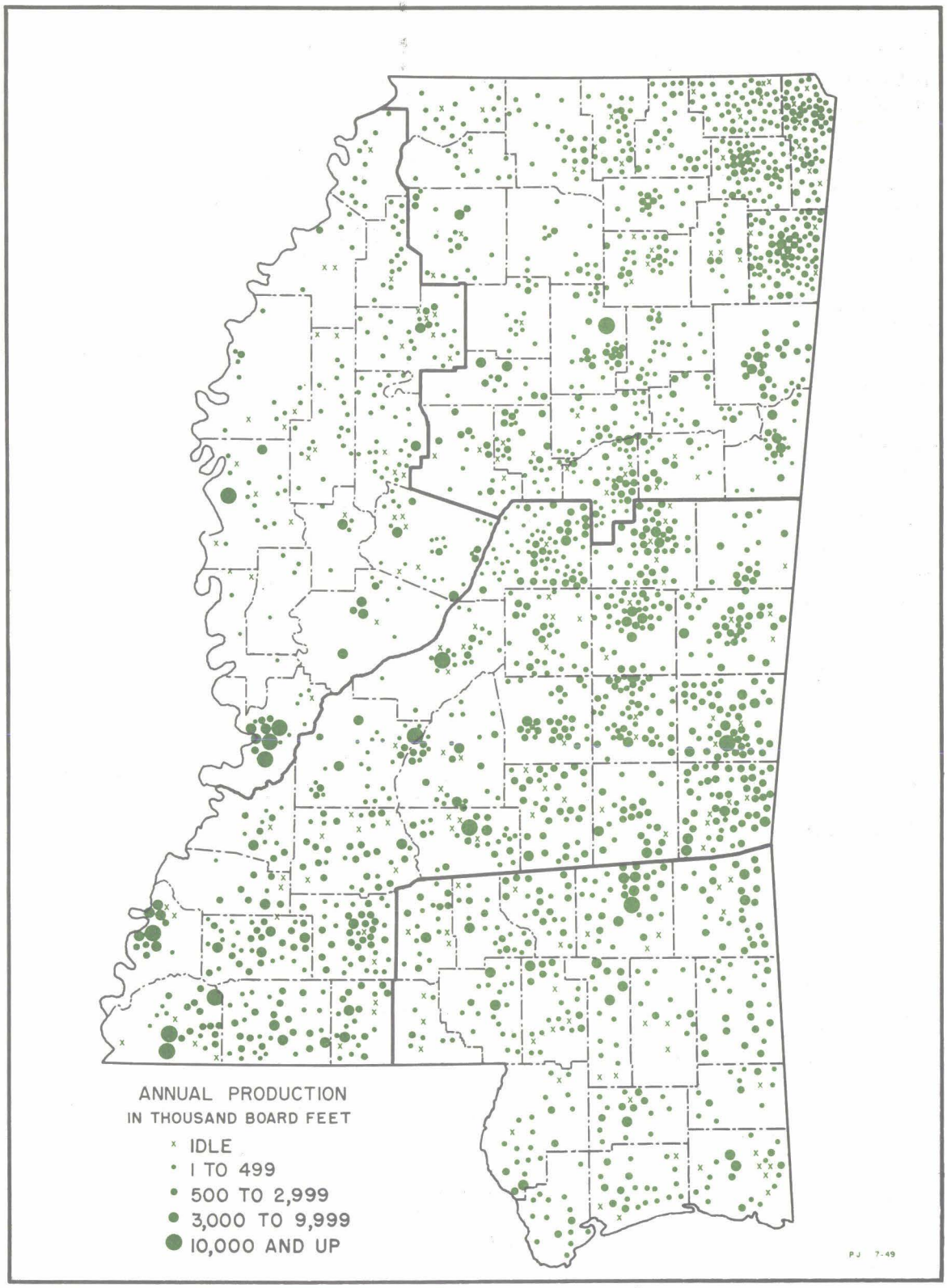

Figure 6.--Location of sawmills, 1946. (Size of dot indicates mill output in 1946. See figure 1 for names of counties.)

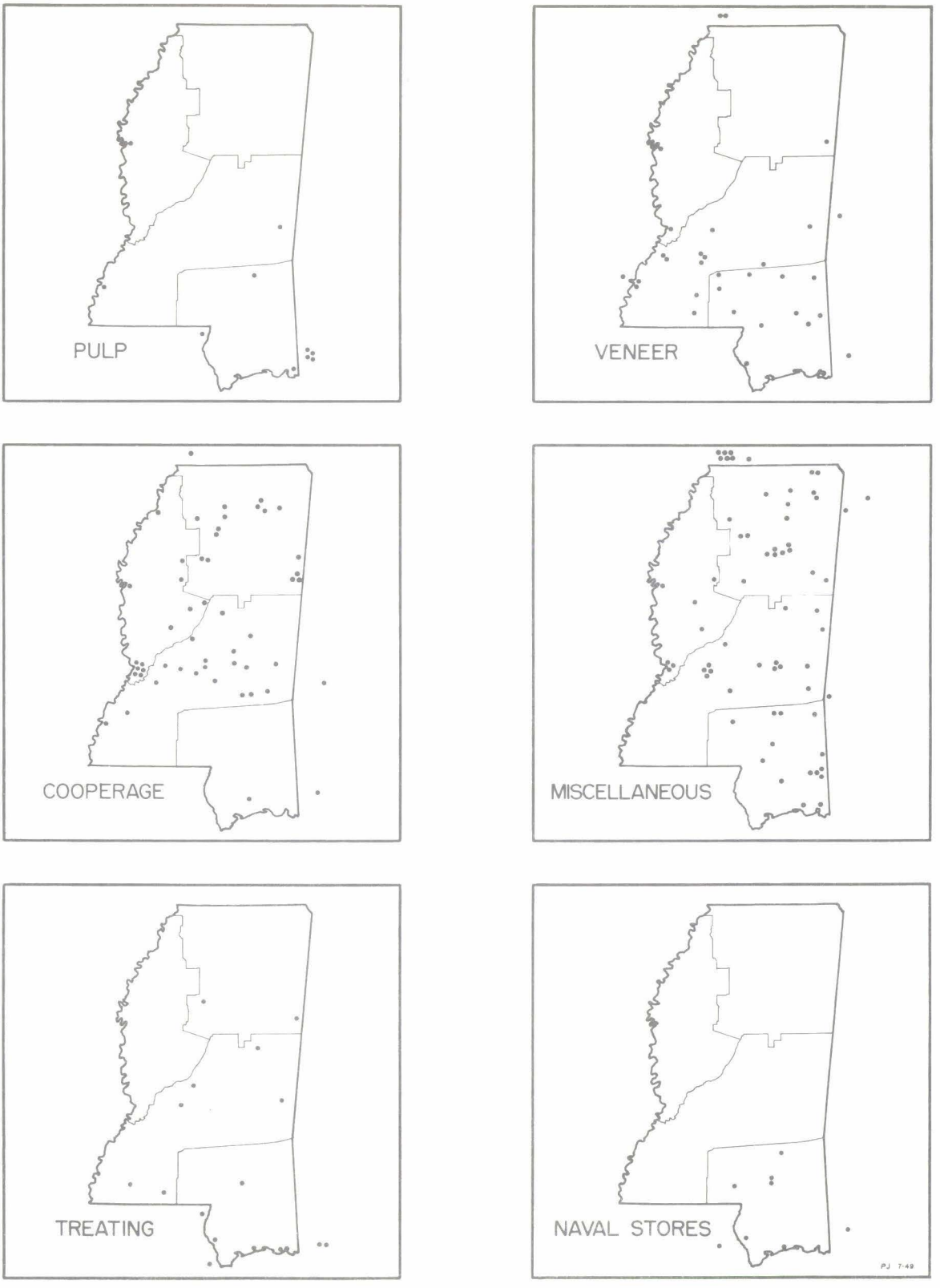

Figure 7.--Location of plants (other than sawmills) that process raw forest products, 1946.

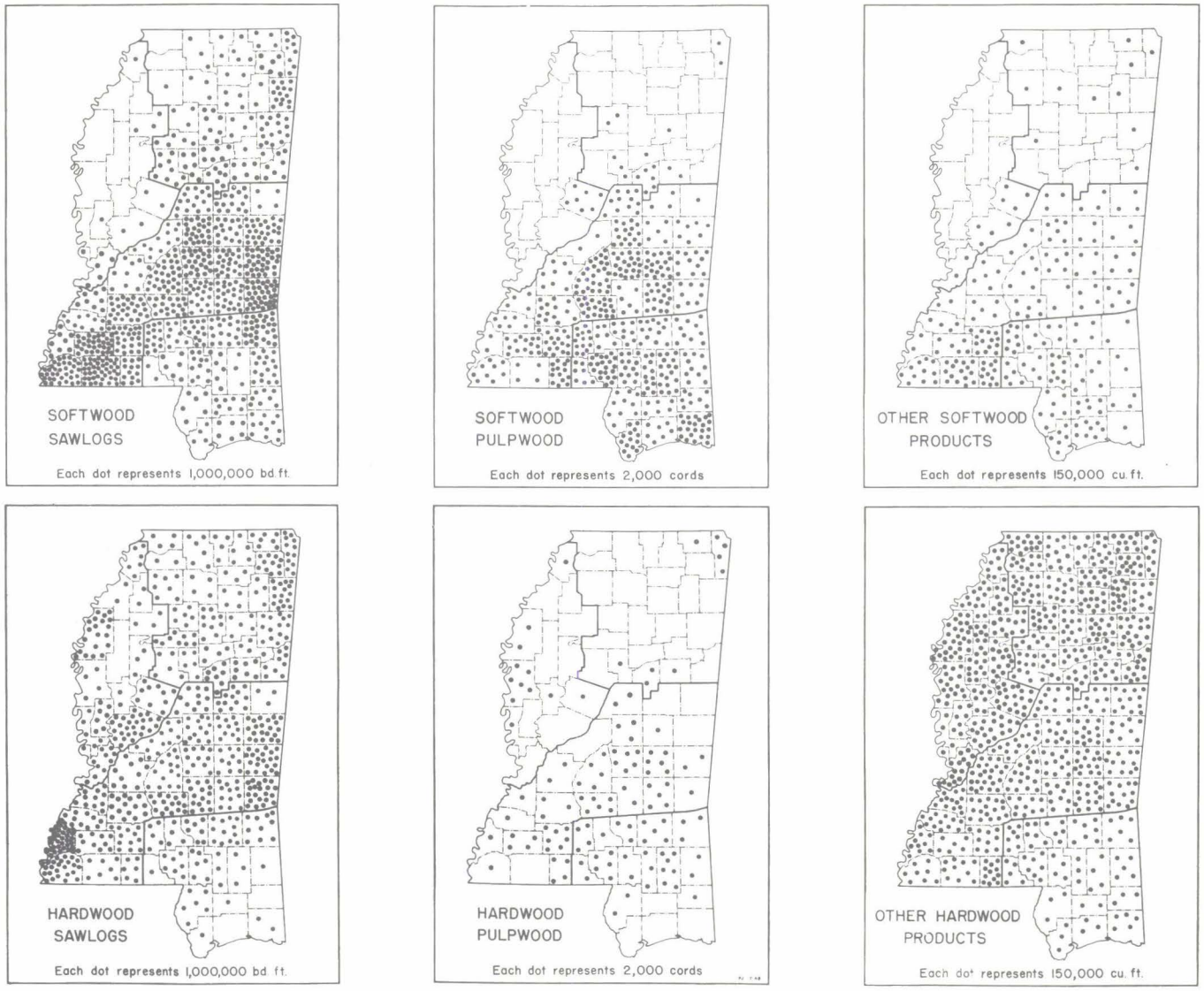

Figure 8.--Cutting of logs and bolts by county, 1946. (A dot represents about the same amount of wood in all six maps.)

pulp mill, also at Natchez, was under construction in 1949. Almost all of the 27 veneer plants are in the southern half of the State. The 48 cooperage plants are distributed pretty widely, except that only 1 plant is in south Mississippi. A dozen creosoting plants and 56 miscellaneous plants, most of which turn out handle stock, are scattered widely about the State. The longleaf-slash pine belt of south Mississippi has 6 wood naval stores plants.

Despite the uneven distribution of some types of plants, the total of nonlumber plants is generally well distributed in the State. There are 38 nonlumber plants in the north, 54 in the central region, 39 in the south, and 23 in the Delta.

Location of Timber-Cutting Operations

Cutting of timber products by county in 1946 is shown in figure 8. Softwood sawlogs come mostly from central Mississippi, not so much from the north and south. All other softwood logs and bolts are harvested almost entirely in the central and south regions. The cut of hardwood sawlogs is spread among the counties of the State more evenly than softwood sawlogs, although it is light in much of the Delta and south regions. The cut of other unprocessed hardwood products is also spread more evenly than other unprocessed softwood products.

The central region is easily the heaviest timber-cutting region of the State (figure 9). This region, with 36 percent of the forest land, produces 59 percent of the softwood logs and bolts and 43 percent of the hardwood logs and bolts. The south region turns out 20 percent of the total raw products; the north, 19 percent; the Delta, 10 percent.

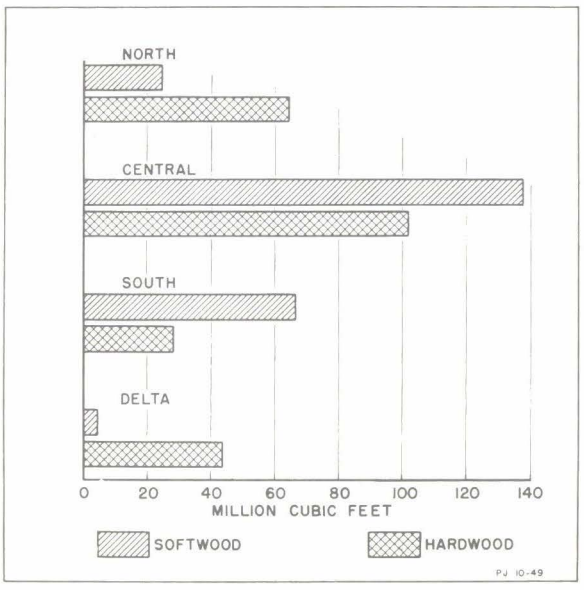

Figure 9.--Total output of all round or split timber products by species group and Survey region, 1946.

The dominance of central Mississippi as a source of logs and bolts is emphasized in figure 10. More than half the sawlogs, pulpwood, and hewn ties, half the veneer logs, and nearly 40 percent of the cooperage bolts and all other logs and bolts come from this region.

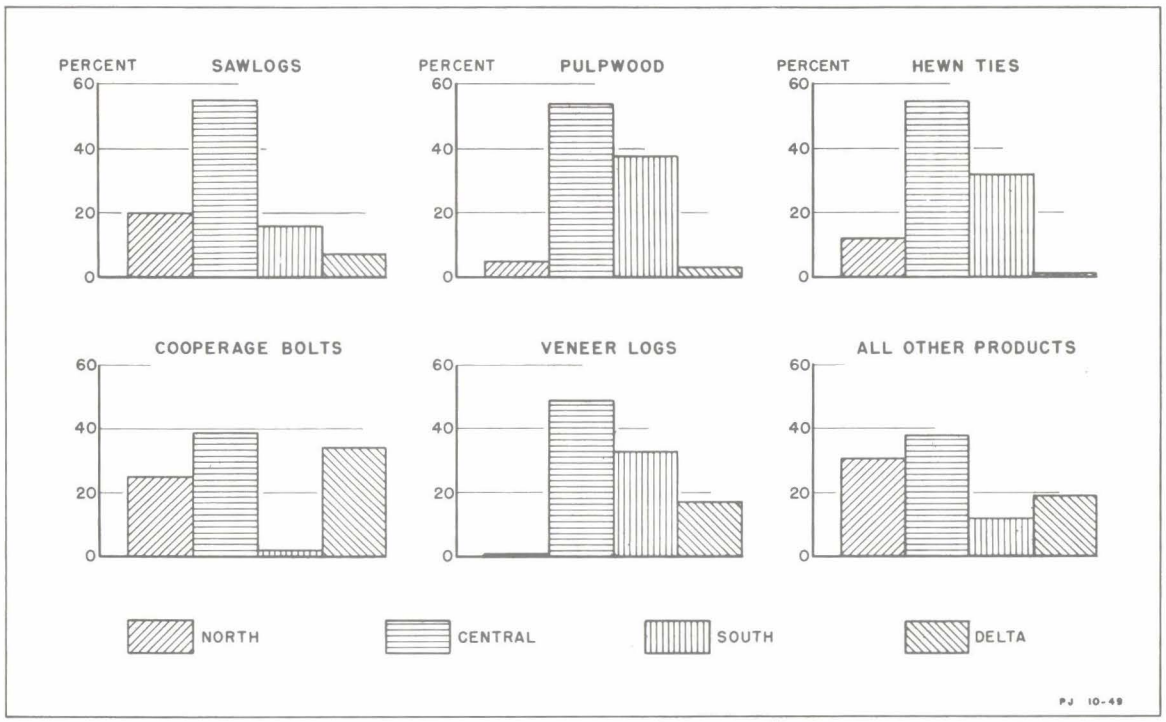

Figure 10.--Cut of major raw timber products by Survey region, 1946.

Movement of Timber Products to Plants

Length of haul

With the notable exception of pulp mills, most Mississippi plants do not reach out many miles for timber. The average veneer plant, which has a wider drawing territory than most plants using logs and bolts, gets 44 percent of its timber in the same county in which the plant is located. Plants manufacturing miscellaneous wood products get 56 percent of their timber in their home counties, and cooperage plants get 61 percent. Sawmill procurement is even more local--sawmills get 74 percent of their timber without crossing a county line.

These averages, of course, obscure large variations among individual plants. The larger the plant and the more specialized its wood requirements, the larger its drawing territory is likely to be. The variation among sawmills is particularly pronounced. Most small sawmills are highly mobile and take advantage of the economies of transporting lumber rather than logs. Large mills, in contrast, are stationary, and as adjacent stands of timber are cut out, must reach ever farther for new supplies of timber.

These facts explain to a large extent why sawmills in the Delta, where the average mill is large, get 44 percent of their sawlogs in their home counties; while mills in the north, south, and central regions, where most mills are small, get 76 to 80 percent of their sawlogs in the counties where the mills are located.

Pulp mills usually draw timber from a wide territory. In Mississippi, they obtain 45 percent of their wood from beyond a radius of 50 miles.

Radius of pulpwood drawing territory Miles	Volume of pulpwood receipts Percent
0 - 50	55
51 - 100	42
101 - 150	3
151 - 200	Negligible
Total	100

Hewn ties and poles and piling do not travel far to concentration yards. Specific data on length of haul are lacking, but the great number of concentration points insures that the bulk of the volume of these products is obtained within a few miles. Subsequent movement, from concentration yard to treating plant, may be for a distance of hundreds of miles.

The remaining unprocessed wood products--fuel wood, fence posts, and miscellaneous domestic items--are as local as woodchucks. They are usually cut in the backyard and used on the same properties.

Wood exports and imports

Logs and bolts of most products do not move widely in interstate commerce. In the 1946 traffic in sawlogs, veneer logs, cooperage bolts, and miscellaneous log products, Mississippi exported 28.6 million board feet (International 1/4-inch rule) to neighboring states, chiefly to Tennessee. It imported 42.1 million board feet, chiefly from Louisiana. The net import of sawlogs was 15.6 million board feet; and of veneer logs, 0.8 million feet. In cooperage bolts, there was a net export of 0.7 million feet; and in miscellaneous log products, a net export of 2.2 million.

Pulpwood is another matter. In 1946, 702,700 standard cords of pulpwood were exported from the State, but imports amounted to only 42,100 cords. The net export of 660,600 cords was substantially more wood than was used by all the pulp mills located in the State. This is 10 percent of the State's total output of all logs and bolts and makes Mississippi an important exporter of unprocessed wood.

How Lumber Production Varies by Size of Sawmill

More than half of Mississippi's lumber output comes from small and medium-size mills which manufacture less than 3 million board feet annually (table 5, page 29). Only four-tenths of the State's output of lumber is from mills sawing 3 million or more board feet a year.

Most of the mills classed medium-size in this report are portable mills which differ from the small mills only in that their production is more sustained. They would be considered quite small alongside of the mills which turn out many millions of board feet annually.

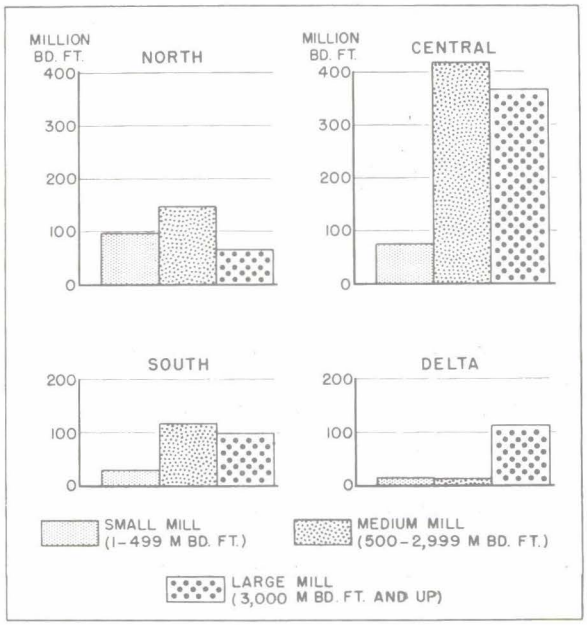

Figure 11.--Lumber production by size of sawmill in the four regions of Mississippi, 1946. (Source: U. S. Bureau of the Census.)

In north Mississippi, where lumber manufacture is concentrated most heavily in small mills, about 80 percent of the output is from mills sawing less than 3 million feet annually (figure 11). In both the central and south regions, some 60 percent of the output is from the small and medium-size mills, but only one-tenth of the total is from mills sawing less than 500,000 feet. Only the Delta manufactures most of its lumber at large mills.

Effect of Cutting on Stands

Degree of utilization in logging

When total growing-stock volumes[3/] are compared with the cubic volumes of derived logs and bolts, wide differences in the degree of utilization for different products are discovered (figure 12).

3/ Total growing-stock volume, as measured by the Southern Forest Survey, is the cubic volume of sound, usable wood in sawlog portions of sawlog trees, and in the upper stems of softwood sawlog trees and entire stems of cordwood trees to a minimum top diameter of 4 inches inside bark. Sawlog trees are live, merchantable softwoods 9.0 inches or larger in d.b.h., and hardwoods 11.0 inches or larger in d.b.h. Cordwood trees are well-formed trees smaller than sawlog trees but at least 5.0 inches in d.b.h.

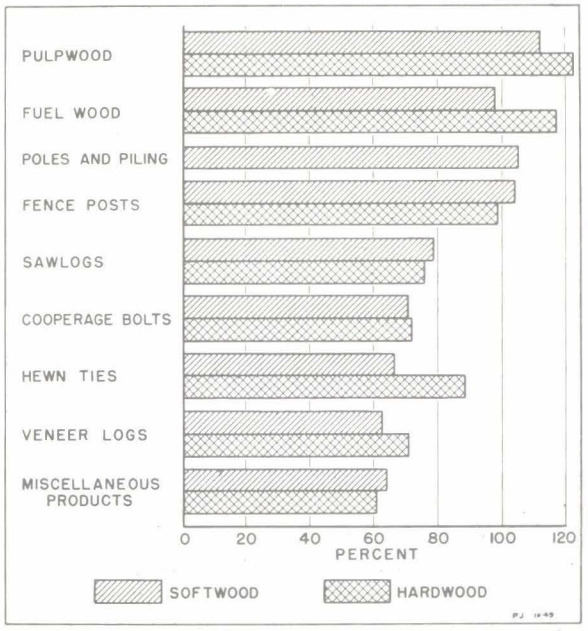

Figure 12.--Net cubic volume in logs and bolts utilized as a percentage of the total growing-stock volume of the trees from which they were cut, 1946.

The most striking example of large use of the cubic volume of trees harvested is pulpwood, where substantially more volume is cut and utilized than is measured in the growing stock by the standards of the Forest Survey. There are several reasons for this. Pulpwood bolts are frequently cut beyond a 4-inch minimum tree top diameter in softwoods, and beyond the top sawlog in hardwood sawlog trees; trees cut for pulpwood are sometimes below the Survey's definitions of a cordwood tree; and very slight losses occur from logging damage, felling breakage, and the abandonment of logs in the woods.

Although not as striking as pulpwood in this respect, other products which are utilized in the round or split form--fuel wood, poles and piling, and fence posts --usually contain more cubic volume than is measured by the Forest Survey in the growing stock from which they are logged.

Logging for products which are not utilized in the round or split form--sawlogs, veneer logs, cooperage bolts, hewn ties, and miscellaneous log products--leaves a considerable portion of the tree in the woods. This is true both for hardwood and softwood species.

Species used for different products

As a result of the combined action of the many types of forest industries, the 1946 drain[4] on growing stock in Mississippi was 554 million cubic feet. Nearly half of this drain on the forest occurred in pine species, 20 percent in oaks, 18 percent in gums, and the rest in a great variety of species.

4/ Drain is the net volume removed from the timber growing stock through cutting of timber commodities and attendant logging waste, and through land clearing.

Here is a summary of the drain on principal species:

Species	Growing-stock drain
	Million cu. ft.
Pines	267.5
Other softwood	2.1
Gums	99.3
Other soft-textured hardwood	34.6
Oaks	113.2
Hickory	8.4
Other firm-textured hardwood	28.5
Total	553.6

The intensity of use is reflected not so much in the total volume of drain as in the proportion of inventory drained annually. By this latter standard, the picture of use is somewhat different. Pines are used most intensively, followed by gums, other soft-textured hardwoods, and oaks. Generally, the low-value species such as hickory and beech are little used.

Species	Proportion of inventory taken in 1946 drain
	Percent
Pines	9
Gums	8
Other soft-textured hardwood	7
Oaks	7
Hickory	3
Other firm-textured hardwood	5
All species	7

The lumber industry accounts for the chief drain on most species, particularly in those species where the intensity of use is high (figure 13). In fact, it may be concluded that if a species is in high demand for sawlogs, the portion of total growing-stock inventory removed annually by logging is high. The converse of this statement is also usually true. If a species is not much in demand for sawlogs, as in the case of hickory and miscellaneous hardwoods, only a small portion of total growing-stock inventory is removed annually.

Size, quality, and proportion of volume cut

A detailed report on cutting in Mississippi for six major timber products--sawlogs, pulpwood, fuel wood, hewn ties, cooperage bolts,

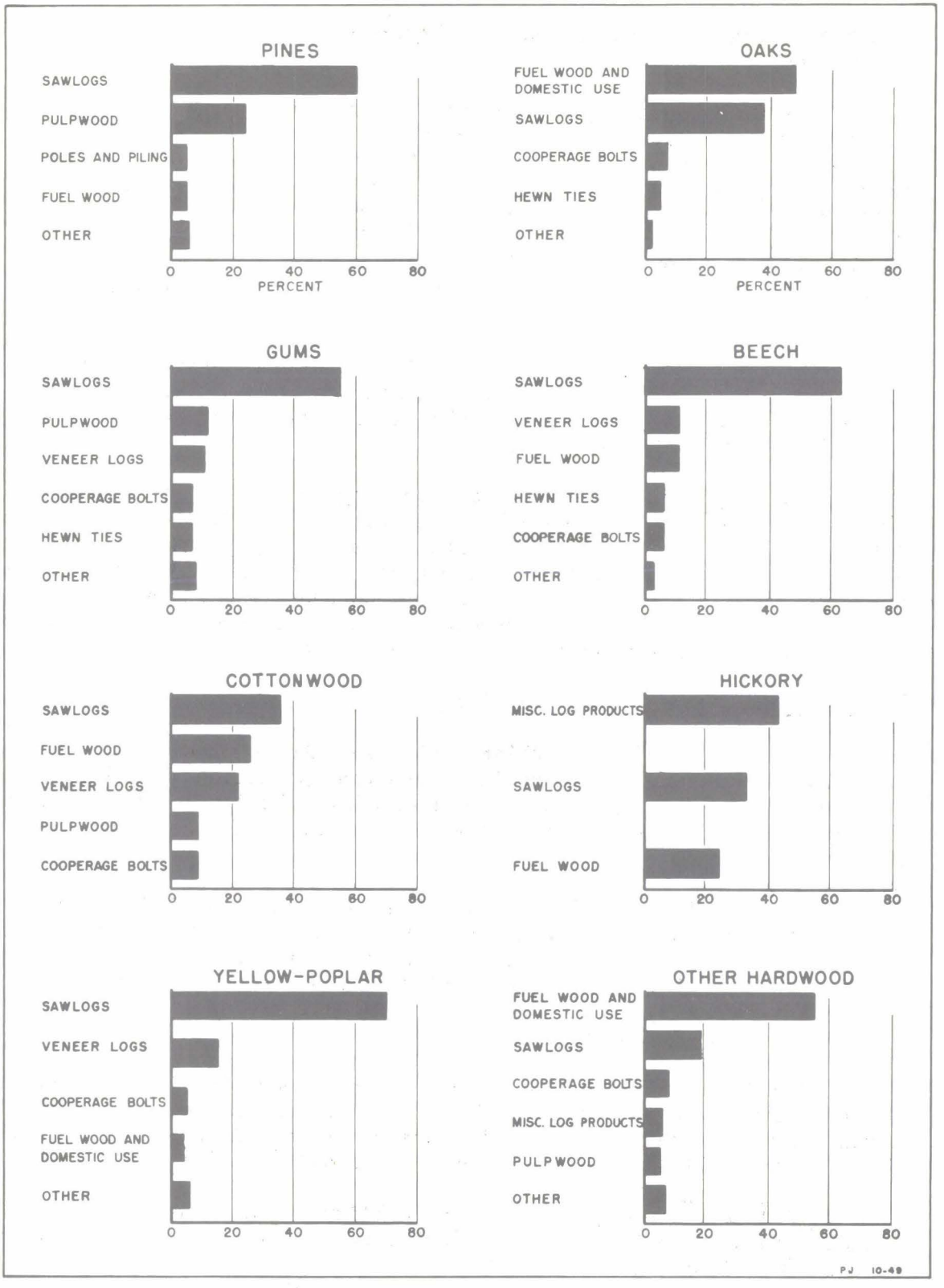

Figure 13.--Drain on major species for different timber products, 1946.

and veneer logs--was published recently.[5] Only a few of the highlights need to be summarized here.

The average sawlog cutting in pine stands takes nearly all trees over 12 inches d.b.h. and almost three-fourths of the volume in 10- and 12-inch trees. Pulpwood cutting takes an even heavier toll--three-fourths of the volume in 6- and 8-inch pine trees is removed in the average operation. Larger trees are cut less heavily for pulpwood because they are hard to handle and owners want to save these trees for sawlog cuts. Cutting of pine for hewn ties and fuel wood does not appear to be as heavy as cutting for sawlogs and pulpwood.

Hardwood cutting is more selective than pine cutting in regard to the proportion of stand volume removed. This holds for all products except fuel wood, which takes a greater proportion of small trees in hardwood than in pine.

However, the picture for hardwood logging is less favorable when log grade[6] and species selection are considered. The typical hardwood operator cutting sawlog-size trees for any product takes all trees with grade 1 logs and more than two-thirds of the trees with grade 2 logs. Moreover, cutting is concentrated among the more valuable species. Thus, the merchantable hardwood trees left standing are chiefly low-value species of small size and poor quality.

Large sawmills versus small sawmills

It was pointed out earlier that six-tenths of the State's output of lumber is from mills producing less than 3 million board feet annually. Because they account for so much of the lumber manufactured, the small and medium-size mills have a dominant influence on timber management.

These mills have aided greatly in the maintenance of lumber output in recent decades during which the size of the average tree has diminished and saw-timber stands have become smaller and more scattered. Their mobility, low costs of operation, and ability to handle small timber economically, permit frequent changes of location for a small volume of sawlogs at each setting.

The fact that almost any stand of saw timber is within reach of a portable mill is not an unmixed blessing to timber management. In tree sizes below 20 inches d.b.h., both pine and hardwood stands are cut more heavily for small sawmills than for large sawmills. In bigger trees, the

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5/ James, Lee M., and Hoffman, William P. Mississippi timber stands before and after cutting. South. Forest Expt. Sta. Forest Survey Release 60, 19 pp., illus. 1949.

6/ Log grades recognized are those described in "Interim sawlog grades for southern hardwoods." Revised. South. Forest Expt. Sta., 9 pp. 1948.

severity of cut is about the same. Small mills take virtually all pine sawlogs, regardless of grade. Logging for large mills leaves some pine sawlog growing stock, chiefly in the lower grades. In hardwood stands, the typical logging operation removes all trees with grade 1 logs. However, cutting for large mills leaves a considerably larger proportion of trees with grade 2 and grade 3 logs than does cutting for small mills.

Changes in the forest resource

What changes in the forest resource of Mississippi have accompanied the industrial activity of recent years?7/

Sawlog growing stock on Mississippi's 16.5 million acres of commercial forest amounts to 29-1/3 billion board feet, an average of 1,776 board feet per acre of forest land. This is one-fourth less sawlog timber than there was 14 years ago (figure 14). North Mississippi, where the timber was already heavily depleted at the time of the first Survey, has had the heaviest loss in sawlog growing stock--41 percent. The present sawlog volume in this region now averages 1,060 board feet per acre. In central Mississippi, sawlog volume has gone down 24 percent. In the Delta, it has dropped 29 percent. Only in south Mississippi has there been an increase in sawlog volume--3 percent.

Total growing stock amounts to 7.7 billion cubic feet, roughly 7 cords per acre of forest land. With one-third of the total growing stock in trees below sawlog size--where growth is most vigorous and drain least severe--the declines in total growing-stock volume have been less sharp than for sawlog growing stock. In some regions volume increases have occurred. For the State as a whole, the decline in softwood growing stock has been 20 percent; hardwood volume has not changed (figure 14).

A marked shift from pine to hardwood is occurring in the upland forest. Pine is usually preferred to hardwood in most upland areas, but nearly two-thirds of the growing-stock growth is in hardwood. These contrasts between species in logging and growth are emphasized by forest type changes between the two Forest Surveys. Pine forests (in which pines make up at least a fourth of the dominant trees) have been replaced by hardwood forests on 2.2 million acres. The area of loblolly-shortleaf pine forests has shrunk by 21 percent; longleaf-slash pine, 29 percent. Upland hardwood types, however, have more than doubled in area.

The result of the creaming of stands in Mississippi logging operations is that two-thirds of the hardwood saw timber is in grade 3 logs--small logs and logs which will yield less than one-third of their volume in higher grades of lumber, and logs whose defects limit their usefulness to ties and timbers. As for softwood, 62 percent of the sawlog volume is in grade 3 trees having less than 12 feet of clear bole. In addition to

7/ For detailed data on the forest resource of Mississippi, see "Forest statistics for Mississippi." South. Forest Expt. Sta. Forest Survey Release 59, 67 pp., illus. 1949.

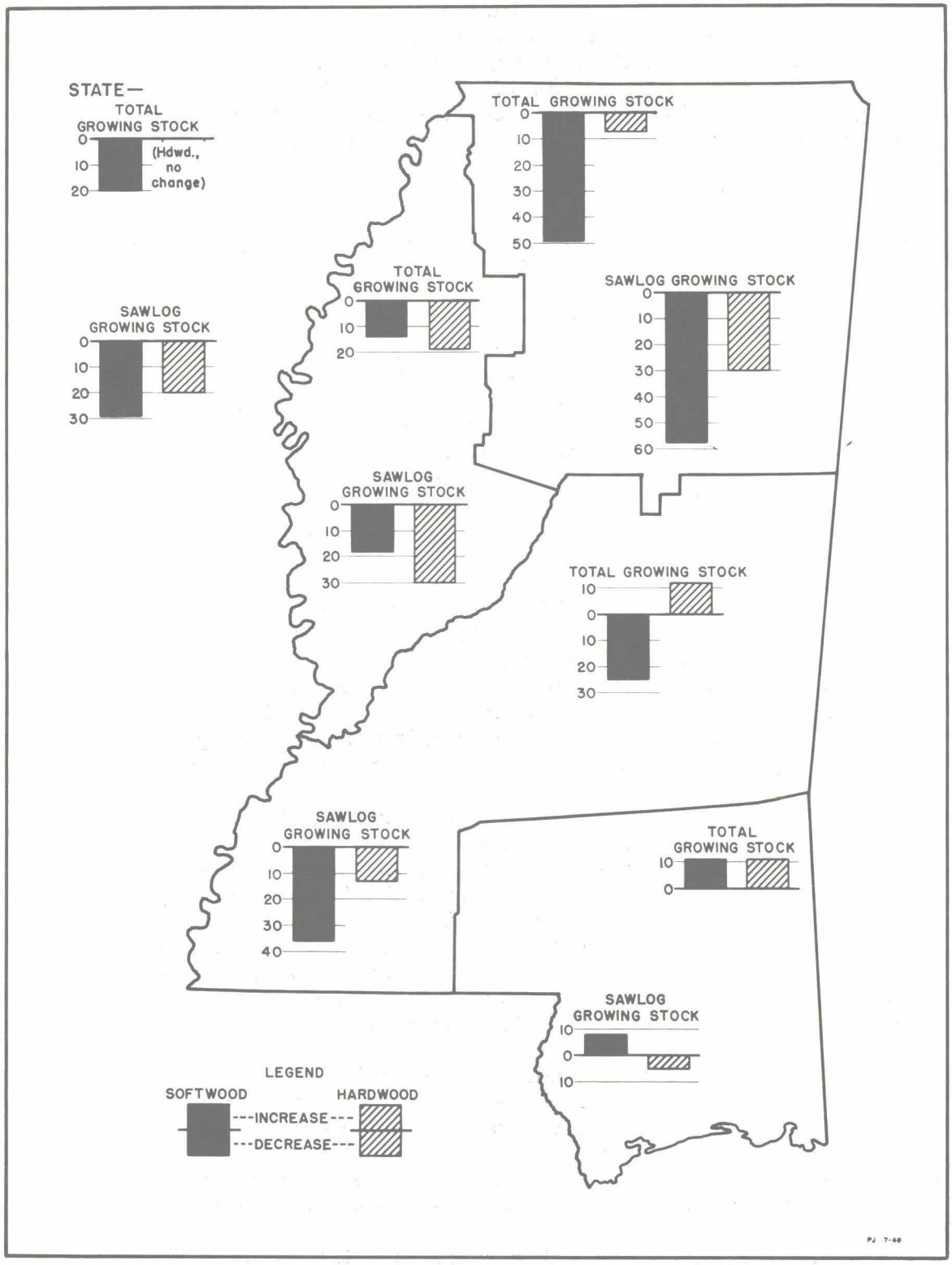

Figure 14.--Percentage change in sawlog and total growing-stock volume between 1932-35 and 1946-48.

the downgrading of growing stock, there has been an increase of nearly one-fifth in the volume of cull trees[8] since the first Survey. Cull trees now take up a fourth of the entire growing space.

Mississippi's timber is also smaller than it used to be. Among softwoods, 6-inch trees (from 5.0 to 6.9 inches d.b.h.) increased in numbers since the first Survey and 8-inch trees about held their own; but the number of trees in all larger size classes declined. In 26-inch and larger trees, the decline amounted to two-thirds. Among hardwoods the story in general is the same, except that the small trees have increased in numbers up through the 14-inch class, and the declines in larger tree sizes have been less severe than for softwoods. Now nearly a third of Mississippi's growing stock is in trees of less than sawlog size.

The Outlook for Timber Production

Can Mississippi's forests continue to support, at recent levels of output, the industries now drawing on them? The volume of timber harvested has held about the same in recent decades only because industry adjusted itself to the use of smaller trees, poorer quality trees, and, frequently, less valued species than it used to cut. Further adjustments toward the use of poorer quality timber may be forced on the forest industry, but there are obvious limits to this method of expanding the utilizable forest resource.

Improved forest management is the real key to the problem of sustaining timber output. Good forest management, if applied widely and immediately to the forests of the State, might not sustain both the quantity and quality of production in the short run, yet would surely increase them in the long run.

But what will happen if there is no change in the rate of improvement in forest management? For the purpose of this discussion, it will also be supposed that the forest industry needs to use timber of the same sizes and quality that it uses now (except where the contrary is specifically noted) and that there will be no significant change in landownership.

Lumber

Between the Forest Surveys of 1932-35 and 1946-48, softwood lumber manufacture averaged 925 million board feet annually, and hardwood 418 million feet. During the same period of 14 years, softwood and hardwood sawlog volume dropped heavily and tree size diminished.

Continuation of such heavy declines in saw-timber trees can only lead to curtailed lumber output, both in softwoods and hardwoods.

8/ Live trees 5.0 inches or larger in d.b.h., which because of decay or sound defect fail to meet the specifications for cordwood or sawlog trees.

This conclusion is supported by two factors: (1) In pine, nearly 30 percent of the volume cut for sawlogs is now in trees below 14 inches d.b.h., the same sizes in which pulpwood cutting is concentrated. This means that competition from the pulp industry for pine timber will be felt by lumbermen more strongly than in years past. (2) In hardwood, the better quality trees and more valuable species are being depleted at a faster rate than the 20-percent decline in sawlog volume indicates.

Pulpwood

Two factors--the prospect of reduced timber inventory because of the great expansion which has already occurred in pulpwood production, and increasing competition for small trees with the lumber industry --may provide an effective brake to the trend of rapid increase in pulpwood cutting. The generally well-managed pulp company lands are not extensive enough to produce more than part of recent pulpwood requirements.

The cutting of pulpwood, which occurs principally in trees 6 to 12 inches in d.b.h., has not been enough to change the total softwood volume in these tree sizes between the Forest Surveys of 1932-35 and 1946-48. However, current pulpwood production is twice as much as it averaged during the 14 years between the two Surveys. Even if softwood pulpwood output should remain stationary at the 1948 level of 1.2 million cords (assuming for a moment that all other factors bearing on the timber situation remain unchanged as compared to the years between the two Surveys), the softwood inventory in 6- to 12-inch trees will go down about one-fifth in another 14 years. It must be emphasized that this estimate is not a prediction, since it is based on the unlikely assumption of no changes in the quality of timber management, the volume of cutting, or the standards of utilization.

Perhaps more important to the future of pulpwood production in Mississippi is the fact that sawlog cutting for lumber has been moving steadily into the smaller tree sizes which are used for pulpwood. At present, nearly 30 percent of the pine sawlog cut is in trees 6 to 12 inches in d.b.h. If the trend of softwood saw-timber inventory continues downward (down 29 percent from 1932-35 to 1946-48), an even larger proportion of sawlogs will come from small tree sizes, and competition between the pulp and lumber industries will become much sharper.

Veneer

Four-fifths of all veneer production is from sweetgum, black and tupelo gums, cottonwood, and yellow-poplar; and roughly nine-tenths of all production is from trees 20 inches d.b.h. and larger. The resource in these species and sizes amounts to 1,290 million board feet. Grade limitations cut down the resource which would be usable, by current standards, to no more than 1,000 million feet. To this inventory, about 50 million feet a year are added in growth.

These statistics might indicate a resource which would be adequate to maintain the present level of drain for veneer (128 million board feet in 1946) for a few years. But other industries, particularly

the lumber industry, compete for the same tree species, sizes, and grades. The effect of this competition is seen in the Forest Survey record of a drop of 21 percent in the number of 20-inch hardwood trees between 1932-35 and 1946-48 and bigger declines in larger sizes up to 41 percent in 26-inch and larger trees. When it is realized also that declines have been even greater in the better tree grades which are used for veneer stock, the rapidity of depletion in the resource used for veneer becomes apparent.

Cooperage

The prospect for slack cooperage is favorable, but whether the long-term upward trend in production will continue is another question. Hardwood inventory and growth might be ample to support further expansion of slack cooperage manufacture, but cooperage producers will have to outbid lumbermen and other hardwood users for raw material. Slack cooperage users are in direct competition with other hardwood timber users for much of their timber, both in regard to tree size and tree quality.

The outlook for tight cooperage is less favorable. Some 2,000 million board feet of sawlog volume occurs in species of the white oak group in trees 14 inches d.b.h. and larger, but no more than 500 million feet is in species and quality acceptable for tight cooperage. In 1946, drain of all oak (mostly white oak) for tight cooperage was 50 million board feet, or about 10 percent of the currently usable resource. Since other products also make inroads on the usable resource, there is a strong indication of short supply.

Naval stores

The tremendous cut-back which occurred in the gum naval stores industry of Mississippi with the liquidation of virgin longleaf and slash pine in the 1920's may prove to be permanent. Despite technological improvements in naval stores operations in recent years, much longleaf and slash pine is not chipped because the stands are not considered economical to operate under present conditions.

Since nearly all of Mississippi's naval stores yield is from the stumps of old-growth longleaf and slash pines, it is difficult to see how wood naval stores can be other than a diminishing industry. The resource is estimated to be roughly 6 million tons, which is a ten or fifteen years' supply at the present rate of use.

Other products

Producers of minor products with exacting timber requirements may have some difficulty in obtaining adequate timber supplies. Their ability to get needed timber may depend more on new growth in the particular species and quality required than on their ability to compete with other users of timber.

Fuel wood and minor timber items with unexacting species and quality requirements do not face a prospect of further decline on the basis of timber supply. The forest resource is relatively plentiful in those species, sizes, and grades not in demand for major products.

Viewing the situation generally for all products, the outlook for sustained output is uncertain under present standards of forest management. Aside from possible increase of the utilizable forest resource through changed standards of utilization, an immediate and marked improvement in forest management will be necessary if the forest industry is to have the raw material needed to sustain production at recent levels.

APPENDIX TABLES

Table 4.--Total log and bolt production by Survey region, 1946

Species group and product	State	North	Central	South	Delta
	Thousand cubic feet				
Softwood					
Sawlogs	127,284.9	20,450.6	79,089.3	25,405.0	2,340.0
Fuel wood 1/	11,110.6	1,197.2	7,409.5	1,408.9	1,095.0
Pulpwood	71,825.4	2,681.0	39,208.0	28,964.7	971.7
Poles and piling	14,317.3	140.5	7,253.7	6,923.1	...
Veneer logs	1,427.7	4.3	625.8	730.0	67.6
Cooperage bolts	351.0	...	.2	275.2	75.6
Hewn ties	7,526.4	525.7	4,193.7	2,773.8	33.2
Fence posts	207.4	...	81.7	112.3	13.4
Other	189.1	.1	105.9	74.3	8.8
Total	234,239.8	24,999.4	137,967.8	66,667.3	4,605.3
Hardwood					
Sawlogs	90,631.6	22,549.8	45,212.3	9,186.9	13,682.6
Fuel wood 1/	81,650.5	31,222.1	25,659.5	4,891.0	19,877.9
Pulpwood	18,569.6	1,491.0	9,242.5	5,751.2	2,084.9
Poles and piling	...	...	...	...	...
Veneer logs	11,801.4	78.2	5,919.7	3,644.2	2,159.3
Cooperage bolts	13,351.7	3,429.7	5,272.2	66.7	4,583.1
Hewn ties	13,027.6	1,902.9	7,148.0	3,899.5	77.2
Fence posts	5,192.6	1,998.0	1,959.2	589.7	645.7
Other	5,020.3	2,143.3	1,623.6	441.1	812.3
Total	239,245.3	64,815.0	102,037.0	28,470.3	43,923.0
All species and products	473,485.1	89,814.4	240,004.8	95,137.6	48,528.3

1/ An additional volume of fuel wood not shown in table--62,605,000 cubic feet--is taken from dead timber, cull timber, and fence rows. Fuel from wood slabs and other mill waste is not included.

Table 5.--Lumber production and number of sawmills by size of sawmill, 1946

Size of sawmill 1/ (M bd.ft.)	Mills	Lumber production		
		Softwood	Hardwood	Total
	No.	Million bd. ft.		
		STATE		
1 - 499	1,248	124.2	94.9	219.1
500 - 2999	631	442.6	252.9	695.5
3000 and up	102	289.1	355.2	644.3
Total	1,981	855.9	703.0	1,558.9
		NORTH		
1 - 499	516	47.0	51.5	98.5
500 - 2999	178	71.2	74.6	145.8
3000 and up	12	14.9	50.1	65.0
Total	706	133.1	176.2	309.3
		CENTRAL		
1 - 499	380	49.8	26.4	76.2
500 - 2999	339	277.6	141.1	418.7
3000 and up	53	203.1	161.6	364.7
Total	772	530.5	329.1	859.6
		SOUTH		
1 - 499	195	22.7	7.2	29.9
500 - 2999	100	88.4	29.9	118.3
3000 and up	20	61.0	39.6	100.6
Total	315	172.1	76.7	248.8
		DELTA		
1 - 499	157	4.7	9.8	14.5
500 - 2999	14	5.4	7.3	12.7
3000 and up	17	10.1	103.9	114.0
Total	188	20.2	121.0	141.2

1/ As measured by production of lumber in 1946.

Table 6.--Sawlog production by county, 1946

County	All species	Softwood	Hardwood
	Million bd. ft. (International 1/4-inch log rule)		
Adams	46.2	8.1	38.1
Alcorn	11.0	4.4	6.6
Amite	49.9	42.8	7.1
Attala	27.1	15.7	11.4
Benton	6.5	2.4	4.1
Bolivar	20.0	.2	19.8
Calhoun	17.7	8.2	9.5
Carroll	13.5	8.6	4.9
Chickasaw	9.0	4.5	4.5
Choctaw	16.0	8.4	7.6
Claiborne	19.4	7.9	11.5
Clarke	58.7	37.4	21.3
Clay	5.6	2.0	3.6
Coahoma	2.5	.1	2.4
Copiah	42.2	27.4	14.8
Covington	21.4	14.2	7.2
De Soto	4.5	(1/)	4.5
Forrest	9.1	6.3	2.8
Franklin	41.7	32.1	9.6
George	8.6	8.4	.2
Greene	18.0	16.8	1.2
Grenada	14.4	5.1	9.3
Hancock	4.8	3.7	1.1
Harrison	5.7	5.7	(1/)
Hinds	20.2	10.3	9.9
Holmes	11.8	1.8	10.0
Humphreys	2.4	.1	2.3
Issaquena	4.9	(1/)	4.9
Itawamba	31.1	15.1	16.0
Jackson	12.7	10.8	1.9
Jasper	35.4	23.4	12.0
Jefferson	18.7	9.8	8.9
Jefferson Davis	12.3	8.1	4.2
Jones	29.7	17.3	12.4
Kemper	47.5	26.8	20.7
Lafayette	6.1	2.6	3.5
Lamar	16.8	10.7	6.1
Lauderdale	52.1	31.2	20.9
Lawrence	19.1	14.3	4.8
Leake	36.4	23.6	12.8
Lee	5.2	1.5	3.7
Leflore	3.5	.1	3.4
Lincoln	36.0	24.3	11.7

Table 6.--Sawlog production by county, 1946 (Cont'd.)

County	All species	Softwood	Hardwood
	Million bd. ft. (International 1/4-inch log rule)		
Lowndes	16.0	7.1	8.9
Madison	24.3	12.3	12.0
Marion	12.8	6.3	6.5
Marshall	8.8	2.7	6.1
Monroe	30.4	16.4	14.0
Montgomery	11.3	6.2	5.1
Neshoba	26.2	15.3	10.9
Newton	32.5	22.3	10.2
Noxubee	7.1	4.1	3.0
Oktibbeha	13.2	6.5	6.7
Panola	7.5	.8	6.7
Pearl River	12.2	6.2	6.0
Perry	5.6	2.8	2.8
Pike	19.1	13.4	5.7
Pontotoc	7.7	4.3	3.4
Prentiss	16.8	6.2	10.6
Quitman	2.5	.4	2.1
Rankin	43.3	28.8	14.5
Scott	35.1	24.4	10.7
Sharkey	8.2	.8	7.4
Simpson	34.9	19.1	15.8
Smith	36.0	21.5	14.5
Stone	8.9	8.2	.7
Sunflower	.4	.1	.3
Tallahatchie	5.5	2.5	3.0
Tate	2.4	.1	2.3
Tippah	9.0	4.1	4.9
Tishomingo	20.3	8.6	11.7
Tunica	6.2	.7	5.5
Union	5.2	2.2	3.0
Walthall	3.1	1.8	1.3
Warren	17.9	6.5	11.4
Washington	4.4	.1	4.3
Wayne	39.5	29.2	10.3
Webster	9.9	6.1	3.8
Wilkinson	57.7	34.6	23.1
Winston	25.6	13.9	11.7
Yalobusha	8.8	3.2	5.6
Yazoo	29.2	2.3	26.9
Total	1,540.9	854.3	686.6

1/ Negligible.

Table 7.--Pulpwood production by county, 1946

County	All species	Softwood	Hardwood
	Hundred standard cords		
Adams	53	43	10
Alcorn	32	3	29
Amite	97	90	7
Attala	277	228	49
Benton	0	0	0
Bolivar	48	0	48
Calhoun	6	5	1
Carroll	7	6	1
Chickasaw	23	23	0
Choctaw	152	120	32
Claiborne	93	74	19
Clarke	188	163	25
Clay	5	3	2
Coahoma	(1/)	0	(1/)
Copiah	353	288	65
Covington	242	173	69
De Soto	0	0	0
Forrest	320	257	63
Franklin	356	285	71
George	182	158	24
Greene	227	196	31
Grenada	1	(1/)	1
Hancock	276	276	0
Harrison	145	144	1
Hinds	186	150	36
Holmes	162	132	30
Humphreys	28	0	28
Issaquena	27	0	27
Itawamba	0	0	0
Jackson	453	453	0
Jasper	458	365	93
Jefferson	148	121	27
Jefferson Davis	152	127	25
Jones	343	252	91
Kemper	139	135	4
Lafayette	0	0	0
Lamar	288	248	40
Lauderdale	250	213	37
Lawrence	361	283	78
Leake	362	312	50
Lee	0	0	0
Leflore	1	0	1

Table 7.--Pulpwood production by county, 1946 (Cont'd.)

County	All species	Softwood	Hardwood
	Hundred standard cords		
Lincoln	462	332	130
Lowndes	1	1	0
Madison	40	36	4
Marion	514	421	93
Marshall	1	1	(1/)
Monroe	1	1	(1/)
Montgomery	65	54	11
Neshoba	115	103	12
Newton	483	363	120
Noxubee	30	25	5
Oktibbeha	63	44	19
Panola	2	(1/)	2
Pearl River	243	198	45
Perry	462	331	131
Pike	357	278	79
Pontotoc	0	0	0
Prentiss	12	2	10
Quitman	3	0	3
Rankin	646	543	103
Scott	551	427	124
Sharkey	5	0	5
Simpson	555	425	130
Smith	160	123	37
Stone	116	110	6
Sunflower	(1/)	0	1/
Tallahatchie	0	0	0
Tate	0	0	0
Tippah	0	0	0
Tishomingo	123	39	84
Tunica	27	0	27
Union	(1/)	(1/)	0
Walthall	180	143	37
Warren	3	(1/)	3
Washington	113	0	113
Wayne	251	198	53
Webster	29	24	5
Wilkinson	207	184	23
Winston	71	67	4
Yalobusha	49	39	10
Yazoo	1	1	(1/)
Total	12,382	9,839	2,543

1/ Negligible.

Table 8.--Production of fuel wood, fence posts, and miscellaneous domestic products from live timber by county, 1946

County	All species	Softwood	Hardwood
	Hundred standard cords		
Adams	105	22	83
Alcorn	176	6	170
Amite	192	41	151
Attala	227	48	179
Benton	98	3	95
Bolivar	389	0	389
Calhoun	193	7	186
Carroll	193	7	186
Chickasaw	197	7	190
Choctaw	126	4	122
Claiborne	93	18	75
Clarke	178	38	140
Clay	126	4	122
Coahoma	221	0	221
Copiah	246	53	193
Covington	71	15	56
De Soto	245	9	236
Forrest	56	13	43
Franklin	110	23	87
George	36	8	28
Greene	39	8	31
Grenada	123	4	119
Hancock	29	6	23
Harrison	58	12	46
Hinds	389	84	305
Holmes	298	63	235
Humphreys	138	0	138
Issaquena	40	0	40
Itawamba	185	6	179
Jackson	46	11	35
Jasper	170	36	134
Jefferson	126	26	100
Jefferson Davis	67	14	53
Jones	108	24	84
Kemper	192	41	151
Lafayette	168	6	162
Lamar	50	11	39
Lauderdale	198	43	155
Lawrence	60	13	47
Leake	213	46	167
Lee	276	10	266
Leflore	237	0	237

Table 8.--Production of fuel wood, fence posts, and miscellaneous domestic products from live timber by county, 1946 (Cont'd.)

County	All species	Softwood	Hardwood
	Hundred standard cords		
Lincoln	186	40	146
Lowndes	200	7	193
Madison	275	60	215
Marion	77	16	61
Marshall	211	7	204
Monroe	270	10	260
Montgomery	124	4	120
Neshoba	208	45	163
Newton	210	45	165
Noxubee	226	49	177
Oktibbeha	158	5	153
Panola	315	11	304
Pearl River	60	13	47
Perry	42	9	33
Pike	213	46	167
Pontotoc	211	7	204
Prentiss	191	7	184
Quitman	166	0	166
Rankin	240	51	189
Scott	176	37	139
Sharkey	95	0	95
Simpson	190	40	150
Smith	168	35	133
Stone	25	5	20
Sunflower	352	0	352
Tallahatchie	210	0	210
Tate	178	6	172
Tippah	181	6	175
Tishomingo	153	5	148
Tunica	139	0	139
Union	170	6	164
Walthall	73	15	58
Warren	134	28	106
Washington	264	0	264
Wayne	72	16	56
Webster	132	5	127
Wilkinson	140	29	111
Winston	167	35	132
Yalobusha	142	5	137
Yazoo	289	62	227
Total	13,521	1,557	11,964

Table 9.--Pole and piling production by county, 1946

County	All species	Softwood	Hardwood
	Thousand pieces		
Adams	0	0	0
Alcorn	1.4	1.4	0
Amite	99.4	99.4	0
Attala	0	0	0
Benton	0	0	0
Bolivar	0	0	0
Calhoun	0	0	0
Carroll	.3	.3	0
Chickasaw	0	0	0
Choctaw	0	0	0
Claiborne	.7	.7	0
Clarke	4.5	4.5	0
Clay	.5	.5	0
Coahoma	0	0	0
Copiah	4.0	4.0	0
Covington	4.8	4.8	0
De Soto	0	0	0
Forrest	36.1	36.1	0
Franklin	35.4	35.4	0
George	11.9	11.9	0
Greene	1.3	1.3	0
Grenada	2.8	2.8	0
Hancock	48.0	48.0	0
Harrison	47.0	47.0	0
Hinds	0	0	0
Holmes	0	0	0
Humphreys	0	0	0
Issaquena	0	0	0
Itawamba	0	0	0
Jackson	3.4	3.4	0
Jasper	1.9	1.9	0
Jefferson	8.9	8.9	0
Jefferson Davis	16.2	16.2	0
Jones	18.5	18.5	0
Kemper	1.8	1.8	0
Lafayette	0	0	0
Lamar	64.3	64.3	0
Lauderdale	5.7	5.7	0
Lawrence	44.8	44.8	0
Leake	24.7	24.7	0
Lee	0	0	0
Leflore	0	0	0

Table 9.--Pole and piling production by county, 1946 (Cont'd.)

County	All species	Softwood	Hardwood
	Thousand pieces		
Lincoln	84.9	84.9	0
Lowndes	.7	.7	0
Madison	0	0	0
Marion	10.8	10.8	0
Marshall	0	0	0
Monroe	0	0	0
Montgomery	.2	.2	0
Neshoba	2.2	2.2	0
Newton	5.2	5.2	0
Noxubee	.4	.4	0
Oktibbeha	0	0	0
Panola	0	0	0
Pearl River	52.1	52.1	0
Perry	13.6	13.6	0
Pike	59.4	59.4	0
Pontotoc	.2	.2	0
Prentiss	.8	.8	0
Quitman	0	0	0
Rankin	14.3	14.3	0
Scott	18.1	18.1	0
Sharkey	0	0	0
Simpson	20.5	20.5	0
Smith	0	0	0
Stone	46.0	46.0	0
Sunflower	0	0	0
Tallahatchie	0	0	0
Tate	0	0	0
Tippah	.2	.2	0
Tishomingo	1.7	1.7	0
Tunica	0	0	0
Union	.2	.2	0
Walthall	22.6	22.6	0
Warren	0	0	0
Washington	0	0	0
Wayne	1.7	1.7	0
Webster	0	0	0
Wilkinson	64.6	64.6	0
Winston	4.5	4.5	0
Yalobusha	0	0	0
Yazoo	0	0	0
Total	913.2	913.2	0

Table 10.--Veneer log production by county, 1946

County	All species	Softwood	Hardwood
	Million bd. ft. (International 1/4-inch log rule)		
Adams	5.8	1.2	4.6
Alcorn	0	0	0
Amite	.7	0	.7
Attala	0	0	0
Benton	0	0	0
Bolivar	8.0	0	8.0
Calhoun	0	0	0
Carroll	0	0	0
Chickasaw	0	0	0
Choctaw	0	0	0
Claiborne	13.3	.8	12.5
Clarke	.3	0	.3
Clay	.1	0	.1
Coahoma	.2	0	.2
Copiah	7.5	1.1	6.4
Covington	2.9	1.1	1.8
De Soto	0	0	0
Forrest	.1	0	.1
Franklin	.3	.1	.2
George	2.0	1.1	.9
Greene	5.6	1.4	4.2
Grenada	0	0	0
Hancock	2.1	0	2.1
Harrison	.5	.1	.4
Hinds	.9	0	.9
Holmes	0	0	0
Humphreys	0	0	0
Issaquena	1.1	0	1.1
Itawamba	0	0	0
Jackson	4.4	0	4.4
Jasper	4.7	0	4.7
Jefferson	9.0	.4	8.6
Jefferson Davis	2.2	.3	1.9
Jones	1.7	.1	1.6
Kemper	0	0	0
Lafayette	(1/)	0	(1/)
Lamar	.3	(1/)	.3
Lauderdale	2.6	0	2.6
Lawrence	3.6	0	3.6
Leake	0	0	0
Lee	0	0	0
Leflore	2	0	2

Table 10.--Veneer log production by county, 1946 (Cont'd.)

County	All species	Softwood	Hardwood
	Million bd. ft. (International 1/4-inch log rule)		
Lincoln	1.9	.4	1.5
Lowndes	.5	(1/)	.5
Madison	.4	0	.4
Marion	1.2	0	1.2
Marshall	(1/)	0	(1/)
Monroe	0	0	0
Montgomery	0	0	0
Neshoba	0	0	0
Newton	1.2	0	1.2
Noxubee	0	0	0
Oktibbeha	0	0	0
Panola	0	0	0
Pearl River	1.0	0	1.0
Perry	1.6	.4	1.2
Pike	1.2	.2	1.0
Pontotoc	0	0	0
Prentiss	0	0	0
Quitman	0	0	0
Rankin	.4	0	.4
Scott	0	0	0
Sharkey	.7	0	.7
Simpson	1.6	.5	1.1
Smith	2.3	.2	2.1
Stone	1.6	.4	1.2
Sunflower	0	0	0
Tallahatchie	0	0	0
Tate	(1/)	0	(1/)
Tippah	0	0	0
Tishomingo	0	0	0
Tunica	0	0	0
Union	0	0	0
Walthall	1.3	0	1.3
Warren	6.4	.5	5.9
Washington	.3	0	.3
Wayne	4.0	.8	3.2
Webster	0	0	0
Wilkinson	.2	.1	.1
Winston	0	0	0
Yalobusha	0	0	0
Yazoo	1.7	0	1.7
Total	109.6	11.2	98.4

1/ Negligible.

Table 11.--Cooperage bolt production by county, 1946

County	All species	Softwood	Hardwood
	Million bd. ft. (International 1/4-inch log rule)		
Adams	2.6	0	2.6
Alcorn	.3	0	.3
Amite	0	0	0
Attala	3.2	0	3.2
Benton	.3	0	.3
Bolivar	1.0	0	1.0
Calhoun	0	0	0
Carroll	.6	0	.6
Chickasaw	.2	0	.2
Choctaw	0	0	0
Claiborne	1.3	0	1.3
Clarke	1.0	0	1.0
Clay	.2	0	.2
Coahoma	3.9	0	3.9
Copiah	.1	0	.1
Covington	0	0	0
De Soto	0	0	0
Forrest	0	0	0
Franklin	.3	0	.3
George	0	0	0
Greene	0	0	0
Grenada	2.3	0	2.3
Hancock	.1	0	.1
Harrison	1.8	1.8	0
Hinds	6.2	(1/)	6.2
Holmes	10.0	0	10.0
Humphreys	0	0	0
Issaquena	1.1	0	1.1
Itawamba	.1	0	.1
Jackson	0	0	0
Jasper	2.3	0	2.3
Jefferson	.2	0	.2
Jefferson Davis	0	0	0
Jones	0	0	0
Kemper	.1	0	.1
Lafayette	2.6	0	2.6
Lamar	0	0	0
Lauderdale	(1/)	0	(1/)
Lawrence	0	0	0
Leake	.6	0	.6
Lee	.1	0	.1
Leflore	.1	0	.1

Table 11.--Cooperage bolt production by county, 1946

County	All species	Softwood	Hardwood
	Million bd. ft. (International 1/4-inch log rule)		
Lincoln	0	0	0
Lowndes	.4	0	.4
Madison	2.9	0	2.9
Marion	0	0	0
Marshall	.4	0	.4
Monroe	2.8	0	2.8
Montgomery	.3	0	.3
Neshoba	4.6	0	4.6
Newton	2.5	0	2.5
Noxubee	.1	0	.1
Oktibbeha	.2	0	.2
Pancla	1.8	0	1.8
Pearl River	0	0	0
Perry	0	0	0
Pike	0	0	0
Pontotoc	1.0	0	1.0
Prentiss	(1/)	0	(1/)
Quitman	0	0	0
Rankin	8.4	0	8.4
Scott	2.5	0	2.5
Sharkey	.8	0	.8
Simpson	.1	0	.1
Smith	1.1	0	1.1
Stone	0	0	0
Sunflower	0	0	0
Tallahatchie	.7	0	.7
Tate	0	0	0
Tippah	1.1	0	1.1
Tishomingo	0	0	0
Tunica	0	0	0
Union	3.8	0	3.8
Walthall	0	0	0
Warren	8.7	.5	8.2
Washington	1.9	(1/)	1.9
Wayne	0	0	0
Webster	0	0	0
Wilkinson	(1/)	0	(1/)
Winston	(1/)	0	(1/)
Yalobusha	7.7	0	7.7
Yazoo	7.1	(1/)	7.1
Total	103.5	2.3	101.2

1/ Negligible.

Table 12.--Hewn tie production by county, 1946

County	All species	Softwood	Hardwood
	Thousand pieces		
Adams	14.2	7.1	7.1
Alcorn	15.9	4.3	11.6
Amite	48.8	24.8	24.0
Attala	14.6	7.3	7.3
Benton	.1	(1/)	.1
Bolivar	0	0	0
Calhoun	6.7	0	6.7
Carroll	4.7	1.0	3.7
Chickasaw	38.5	1.9	36.6
Choctaw	15.6	5.8	9.8
Claiborne	.8	.4	.4
Clarke	190.7	70.7	120.0
Clay	6.4	1.3	5.1
Coahoma	0	0	0
Copiah	38.7	17.3	21.4
Covington	31.4	14.7	16.7
De Soto	0	0	0
Forrest	5.0	3.0	2.0
Franklin	51.4	25.3	26.1
George	35.7	16.3	19.4
Greene	15.8	5.0	10.8
Grenada	10.2	5.1	5.1
Hancock	8.2	5.7	2.5
Harrison	0	0	0
Hinds	10.9	5.4	5.5
Holmes	.6	.2	.4
Humphreys	.2	1/	.2
Issaquena	0	0	0
Itawamba	0	0	0
Jackson	0	0	0
Jasper	142.0	60.9	81.1
Jefferson	51.2	25.6	25.6
Jefferson Davis	137.7	54.5	83.2
Jones	13.7	4.8	8.9
Kemper	16.1	3.9	12.2
Lafayette	52.6	15.1	37.5
Lamar	76.0	30.7	45.3
Lauderdale	81.4	28.3	53.1
Lawrence	137.1	63.2	73.9
Leake	11.8	7.1	4.7
Lee	1.7	0	1.7
Leflore	12.6	3.8	8.8

Table 12.--Hewn tie production by county, 1946 (Cont'd.)

County	All species	Softwood	Hardwood
	Thousand pieces		
Lincoln	48.2	26.6	21.6
Lowndes	7.7	1.5	6.2
Madison	0	0	0
Marion	155.5	64.2	91.3
Marshall	0	0	0
Monroe	1.1	(1/)	1.1
Montgomery	7.2	2.6	4.6
Neshoba	48.7	11.9	36.8
Newton	125.2	38.1	87.1
Noxubee	47.9	2.8	45.1
Oktibbeha	15.9	5.8	10.1
Panola	0	0	0
Pearl River	11.9	8.3	3.6
Perry	63.6	19.5	44.1
Pike	102.8	38.1	64.7
Pontotoc	5.2	.7	4.5
Prentiss	53.3	1.9	51.4
Quitman	0	0	0
Rankin	39.4	11.8	27.6
Scott	111.5	33.0	78.5
Sharkey	0	0	0
Simpson	56.8	23.8	33.0
Smith	5.8	2.9	2.9
Stone	.8	.5	.3
Sunflower	0	0	0
Tallahatchie	0	0	0
Tate	0	0	0
Tippah	15.7	.7	15.0
Tishomingo	31.4	14.2	17.2
Tunica	0	0	0
Union	4.3	.7	3.6
Walthall	100.6	45.8	54.8
Warren	.4	.1	.3
Washington	0	0	0
Wayne	40.4	11.0	29.4
Webster	4.1	.3	3.8
Wilkinson	90.4	32.6	57.8
Winston	66.5	17.2	49.3
Yalobusha	5.1	2.6	2.5
Yazoo	0	0	0
Total	2,566.4	939.7	1,626.7

1/ Negligible.

Table 13.--Production of miscellaneous log products by county, 1946

County	All species	Softwood	Hardwood
	Million bd. ft. (International 1/4-inch log rule)		
Adams	0.8	(1/)	0.8
Alcorn	0	0	0
Amite	0	0	0
Attala	.1	0	.1
Benton	.3	0	.3
Bolivar	.4	0	.4
Calhoun	1.3	(1/)	1.3
Carroll	.4	0	.4
Chickasaw	1.7	0	1.7
Choctaw	.2	0	.2
Claiborne	.4	(1/)	.4
Clarke	.2	.1	.1
Clay	1.1	0	1.1
Coahoma	0	0	0
Copiah	.4	0	.4
Covington	(1/)	0	(1/)
De Soto	.5	0	.5
Forrest	.1	0	.1
Franklin	.1	0	.1
George	1.0	0	1.0
Greene	.2	(1/)	.2
Grenada	.1	0	.1
Hancock	0	0	0
Harrison	0	0	0
Hinds	1.6	(1/)	1.6
Holmes	.2	0	.2
Humphreys	.5	0	.5
Issaquena	.2	0	.2
Itawamba	0	0	0
Jackson	.1	0	.1
Jasper	.7	.2	.5
Jefferson	.1	0	.1
Jefferson Davis	(1/)	0	(1/)
Jones	1.1	.3	.8
Kemper	.6	0	.6
Lafayette	.3	0	.3
Lamar	.1	0	.1
Lauderdale	.3	0	.3
Lawrence	.1	0	.1
Leake	.1	0	.1
Lee	(1/)	0	(1/)
Leflore	(1/)	0	(1/)

Table 13.--Production of miscellaneous log products by county, 1946 (Cont'd.)

County	All species	Softwood	Hardwood
	Million bd. ft. (International 1/4-inch log rule)		
Lincoln	0	0	0
Lowndes	.7	0	.7
Madison	1.2	0	1.2
Marion	0	0	0
Marshall	.8	0	.8
Monroe	.9	0	.9
Montgomery	.2	0	.2
Neshoba	.3	0	.3
Newton	.6	0	.6
Noxubee	1.8	0	1.8
Oktibbeha	.2	0	.2
Panola	.7	0	.7
Pearl River	0	0	0
Perry	(1/)	0	(1/)
Pike	0	0	0
Pontotoc	1.1	0	1.1
Prentiss	(1/)	0	(1/)
Quitman	0	0	0
Rankin	.1	0	.1
Scott	(1/)	0	(1/)
Sharkey	.6	0	.6
Simpson	.2	0	.2
Smith	.2	.1	.1
Stone	(1/)	0	(1/)
Sunflower	0	0	0
Tallahatchie	.1	0	.1
Tate	(1/)	0	(1/)
Tippah	1.3	0	1.3
Tishomingo	0	0	0
Tunica	.3	0	.3
Union	1.0	0	1.0
Walthall	0	0	0
Warren	1.0	0	1.0
Washington	.4	0	.4
Wayne	.3	.1	.2
Webster	.3	0	.3
Wilkinson	0	0	0
Winston	.4	0	.4
Yalobusha	.1	0	.1
Yazoo	1.3	(1/)	1.3
Total	31.4	.8	30.6

1/ Negligible.